N4L

Sweep Frequency Response Analyzer

SFRA45

Standalone High Accuracy Transformer Analysis

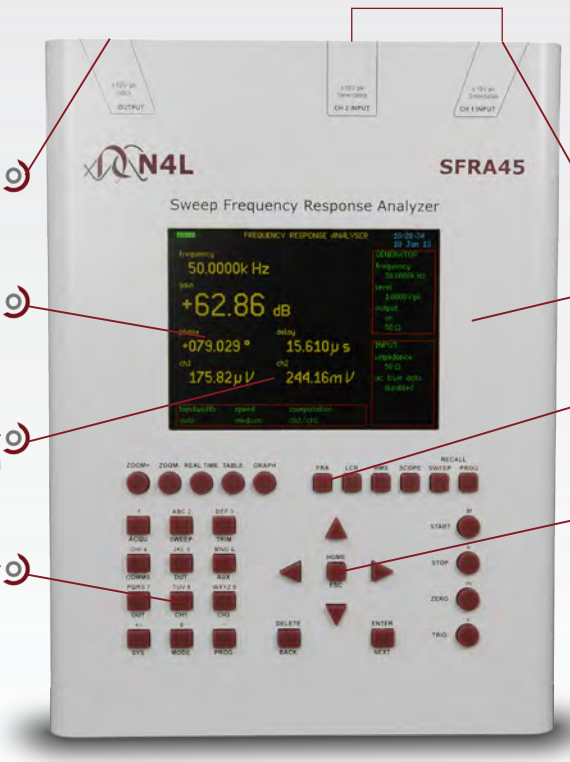
Leading wideband accuracy	Basic 0.02dB with class leading high frequency performance
Wide frequency range	5Hz to 45MHz
Full Colour VGA Display	Enables engineer to perform and store measurements in the field without a PC
PC software included	Remote control, tables, graphs and database management of results
Leading phase accuracy	0.05 degrees basic
Versatile interfaces	RS232, USB and LAN as standard
LCR mode	Fully functional LCR meter to measure transformer LCR parameters
Various measurement modes	FRA, RMS, LCR, Scope
Compliant to IEC60076-18	Fully compliant to IEC60076-18 (Sweep Transformer Analysis Standard)

SFRA45 Portable Sweep Frequency Response Analysis

Full SFRA Testing System in one Case

3x 18m BNC Integrated Cable Reel
SFRA45 Instrument
N4L Bushing Clamps
Rugged Aluminium flight case
2GB USB Memory Stick
2x Earth Clamps and 5m Earth Braids

Product Overview



10Vpk 5Hz to 45MHz Generator

5.7" Full Colour Screen

Perform measurements with or without a PC and view sweeps on screen

Keypad for entering transformer details to fully comply with IEC60076-18

CH1 + CH2 Input, 50Ω or High Impedance

Rugged metal casing ideal for field use

FRA, LCR, RMS and SCOPE modes

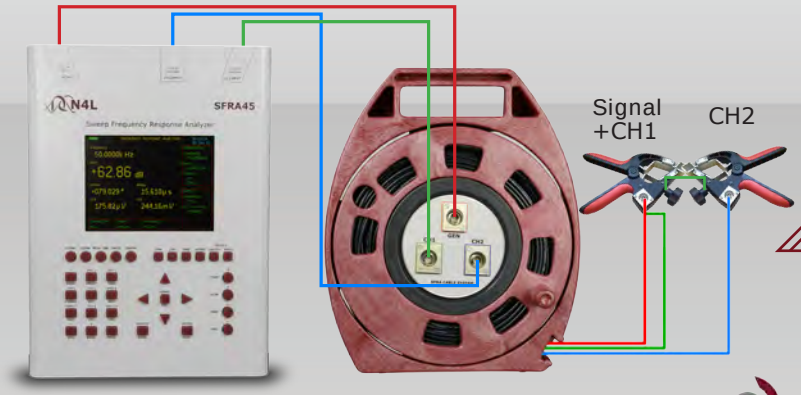
Simple user interface, with ability to view Graph, Real Time and table views of sweeps

The SFRA45 offers both high precision and portability in a single package. Newtons4th have worked alongside one of the markets most respected power transformer manufacturers to provide a comprehensive package with all accessories required for fast, easy to use, reliable and repeatable measurements.

The Complete Solution in one package

SFRA in 4 steps

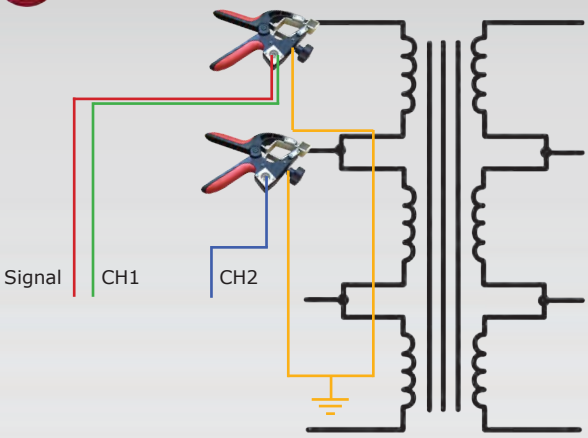
Connect Lead set and Zero Check



Step 1

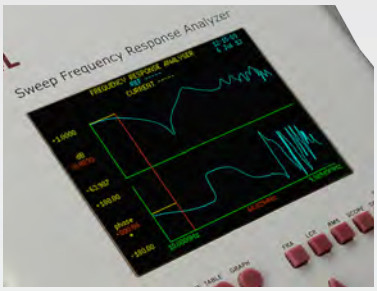
Extend Cable reel, connect Gen and CH1 to clamp 1 and CH2 to clamp 2. Connect clamps together and check for 0dB throughout the sweep range.

Connect up to Transformer



Step 2

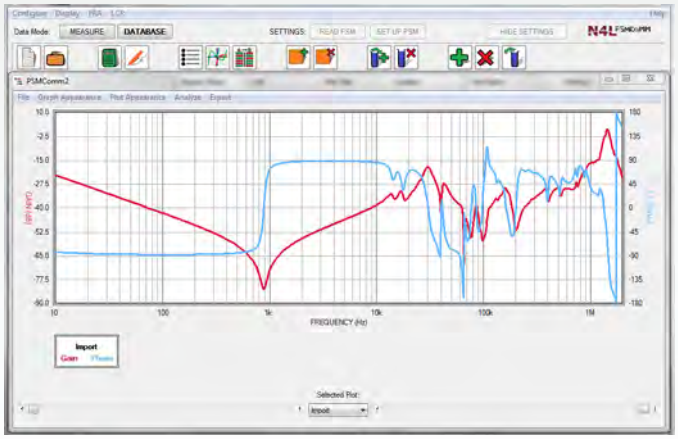
Run sweep direct from front panel or via SFRAComm software



Step 3

Set up the sweep and enter transformer parameters, save sweep to the SFRA45's 1GB internal memory

Remotely control and record direct to software or transfer data later

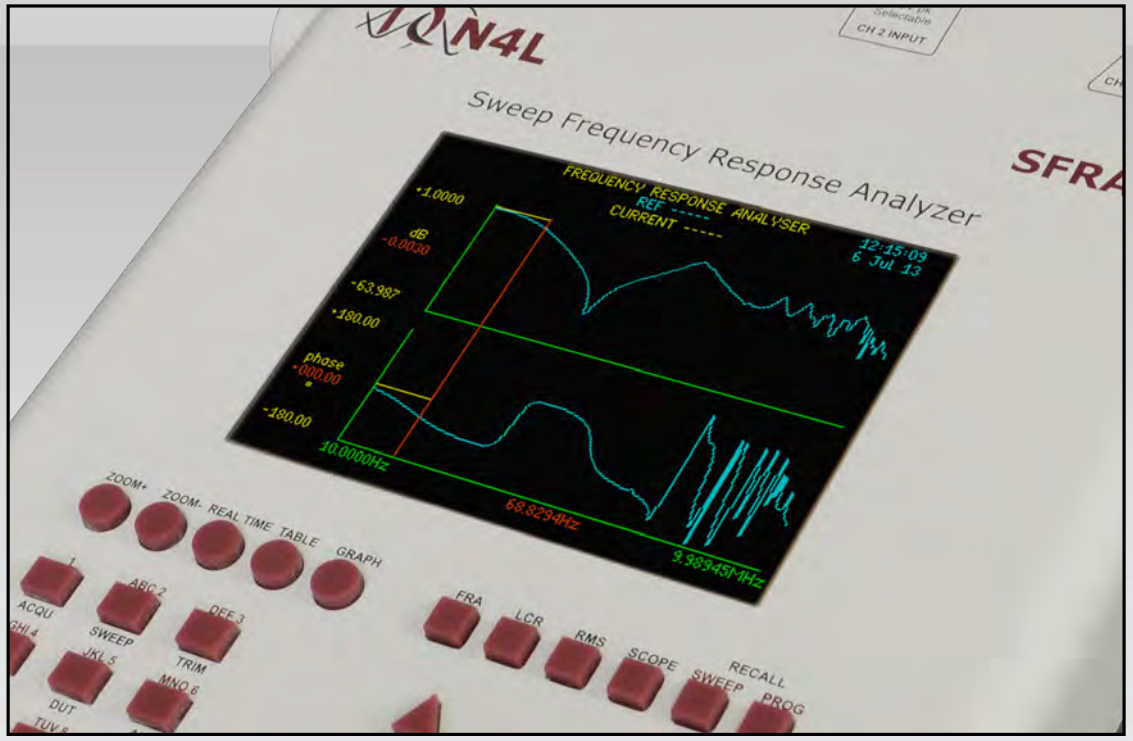


Step 4

SFRAComm software offers a database facility to compare numerous sweeps

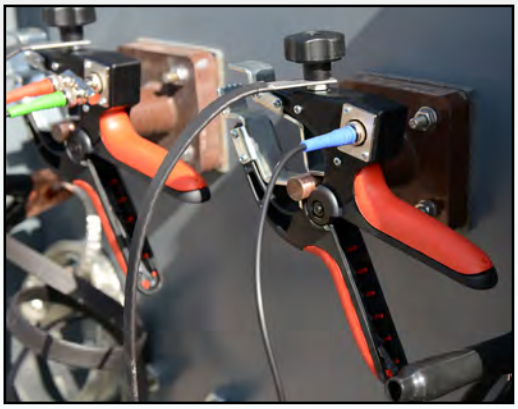
Decrease Test Time with the SFRA45

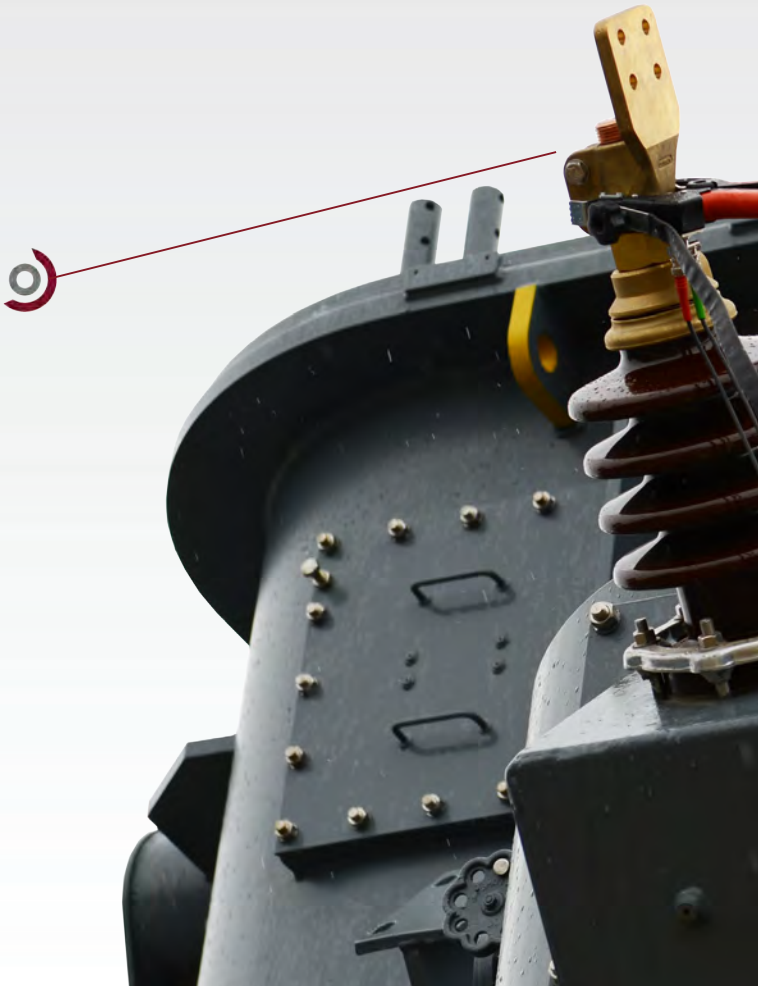
Without the need for a PC to compare transformer fingerprints, the SFRA45 decreases test time enabling the engineer to complete testing in a much shorter period of time than previously possible. The SFRA45 has the ability to utilise exisiting plots saved to internal memory or USB memory stick and use them as a reference during a live measurement. If a problem is detected the test can be interrupted without wasting any time by comparing the plots real time, point by point.



The picture above illustrates the ability to compare plots during a sweep, the graph above shows an immediate dirrerence between the plots giving the engineer the option to cancel the test.

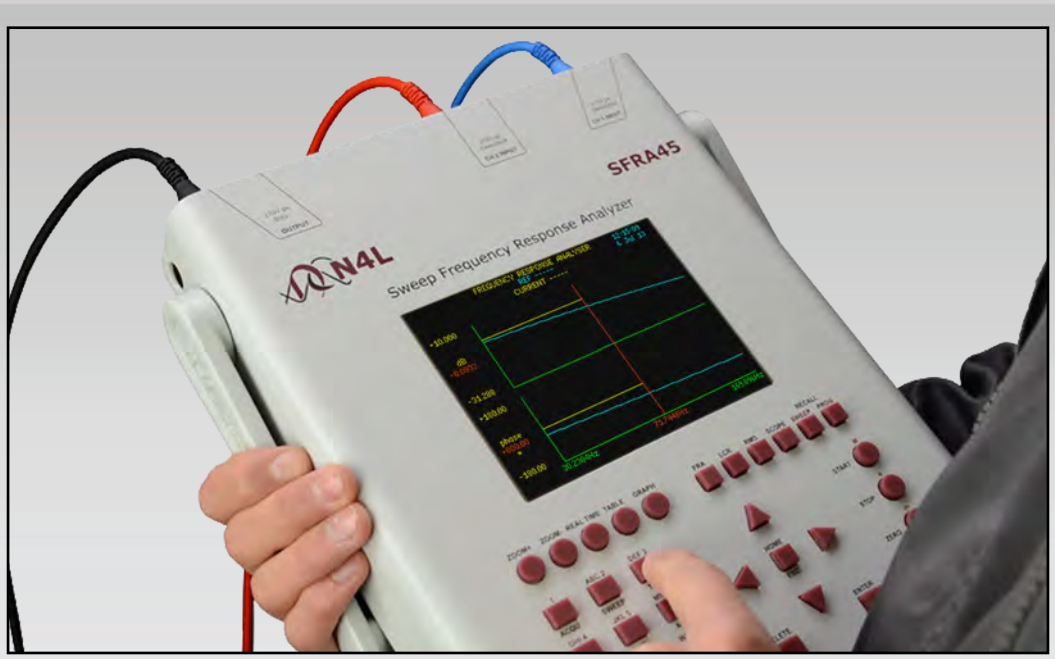
The custom designed N4L SFRA Connection System is unique to N4L. Developed aslongside world leading transformer manufacturers the N4L Connection System includes 2 x rugged clamps, the clamps are designed to cater for all manor of bushing sizes and feature highest quality flush mount BNC connectors.

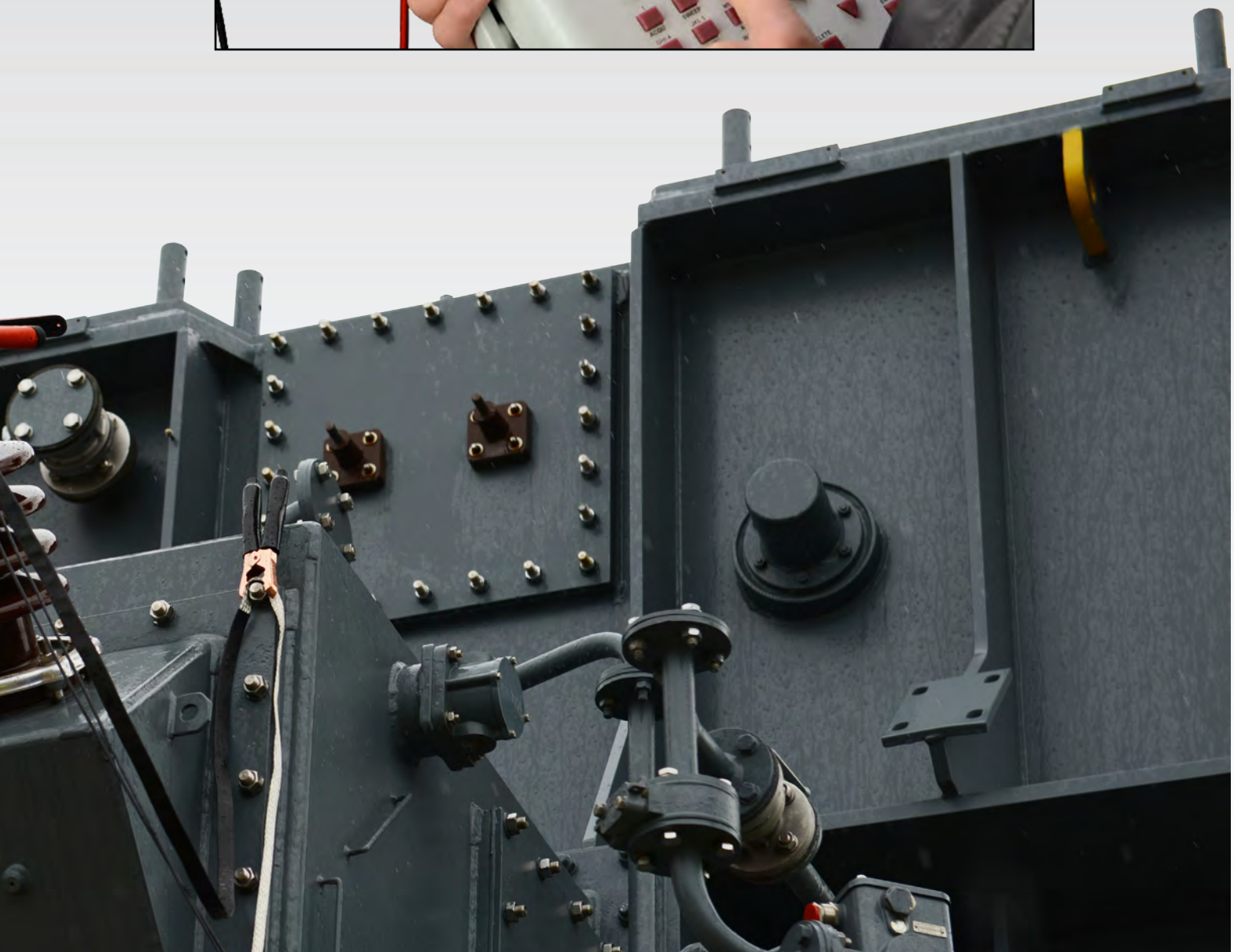




Zoom in for greater detail

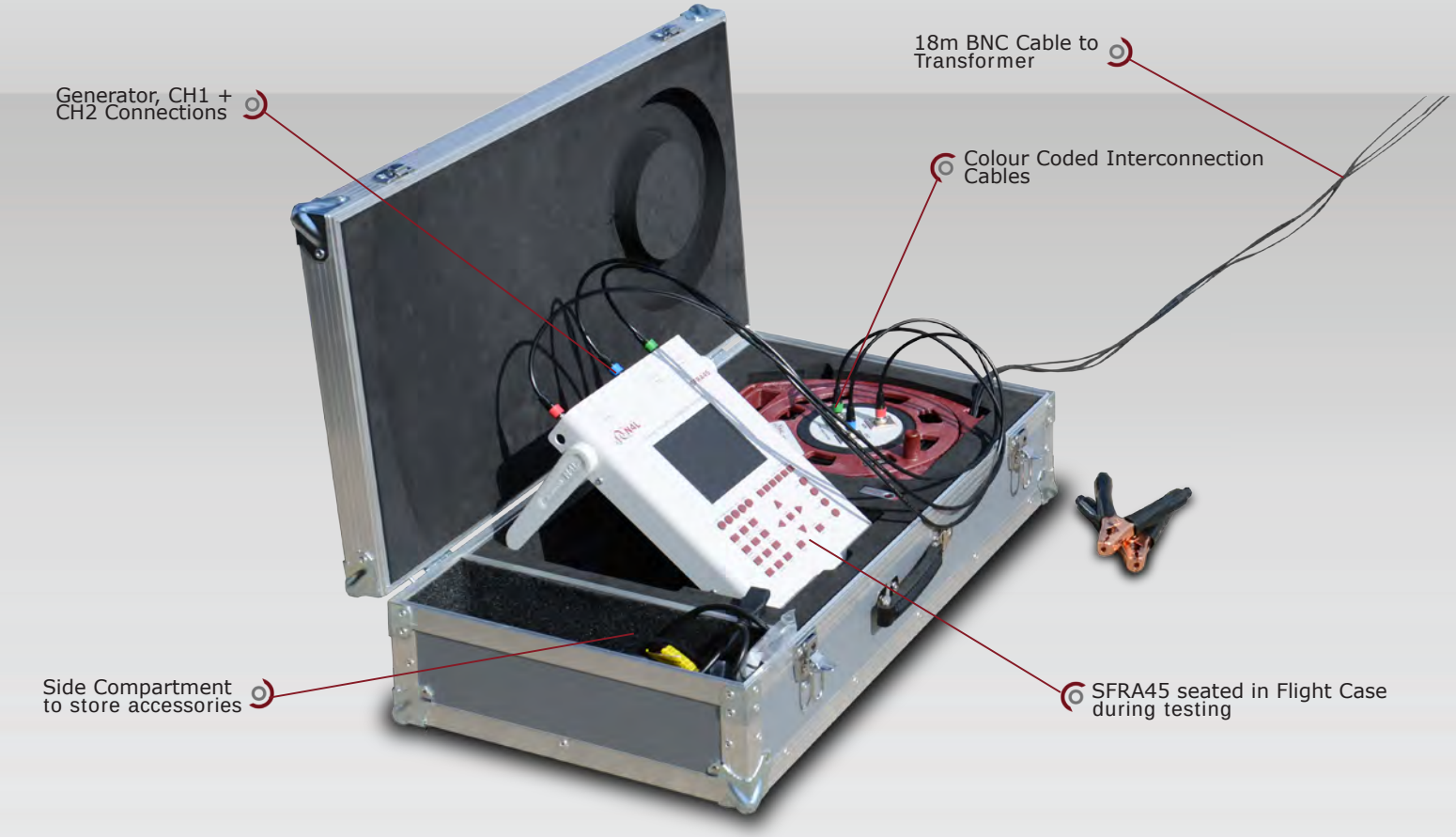
The engineer has the ablity to zoom into a portion of the sweep in order to inspect any differences in the plot in more detail during or after a sweep. This enables diagnosis of transformer faults early on in a trasformer sweep, without the need for a PC. The SFRA45 does not run on a generic operation system, it is based upon embedded software which is more reliable in the field, especially when used as a standalone instrument.





Ease of use in the Field

The SFRA45 measurement system includes colour coded interconnecting leads and "N4L Cable storage reel" This facilitates quck setup times for testing. The SFRA45 and cable reel are designed so that they can be used in situe in the rugged flight case, ensuring the test equipment remains clean when operating in the sometimes challenging field environment.


18m BNC Cable to Transformer
Generator, CH1 + CH2 Connections
Colour Coded Interconnection Cables
Side Compartment to store accessories
SFRA45 seated in Flight Case during testing

Making the connection

An important aspect of reliable SFRA measurement is a sound connection to the transformer. N4L have developed rugged, easy to use SFRA bushing clamps utilising the highest quality materials to ensure reliable connections - everytime.

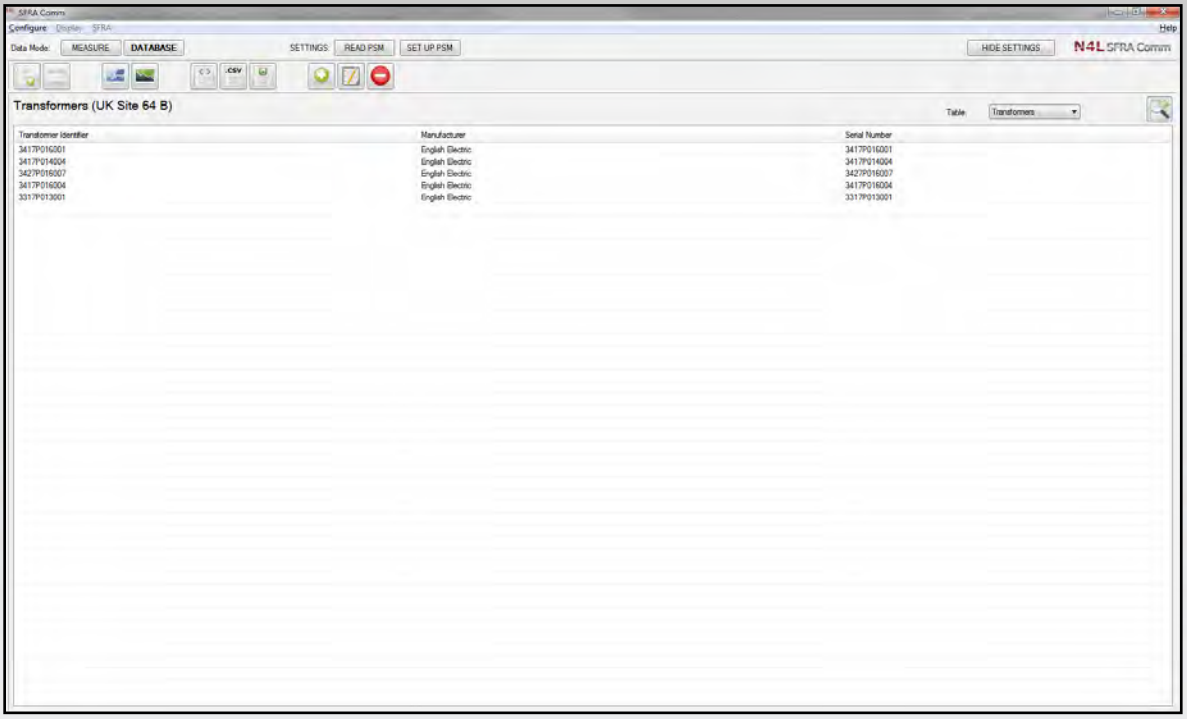
IEC60076-18 Compliance

The SFRA45 and accompanying accessories and software have been developed alongside the IEC60076-18 international standard for sweep frequency anaysis of power transformers.

N4L SFRAComm

Transformer Fault Diagnosis

SFRAComm Software provides excellent fault diagnosis assistance, ranging from a sophisticated database including multiple search options to automatic fault diagnosis algorithms in accordance with DLT - 911/2004 and also provide excellent graphing functionality for the more experienced user.



As illustrated in the grpah below, SFRAComm provides simple, swift and user intuitive diagnosis of transformer sweeps. The user is able to filter out unwanted sweeps from the built in database and select up to 9 sweeps to be plotted on one graph.

MEASUREMENT SPECIFICATION

Frequency Response Analyser	
Measurement	Magnitude, Gain (CH1/CH2, CH2/CH1), Gain (dB), offset gain (dB), phase(°)
Frequency Range	5Hz - 45MHz
Gain Accuracy in dB	0.02dB <50kHz 0.02dB + 0.05dB/MHz < 5MHz 0.1dB + 0.04dB/MHz < 45MHz
Phase Accuracy	0.05° < 10kHz 0.07° + 0.0009°/kHz < 5MHz 5.05° + 0.0001°/kHz < 45MHz
Frequency Source	Generator
Measurement	Real Time DFT, no missing data
Speed	Up to 100 readings per second
Filter	Selectable from 0.2 seconds
Resolution	5 or 6 digits
Input Impedance	50 Ohm or 1M Ohm High Impedance (Selectable)
Dynamic Range	120dB
L C R Meter	
Functions	L, C, R (AC), Q, Tan Delta, Impedance, Phase - Series or Parallel Circuit
Frequency Range	5Hz - 5MHz
Current Shunt	50R Internal or External
Ranges	Inductance Capacitance Resistance
Basic Accuracy	0.5% + 2%/MHz
Sweep Capability	All AC functions
Impedance Range	100mOhm to 100kOhm
True RMS Voltmeter	
Channels	2 (Ground Referenced)
Frequency Range	5Hz -5MHz
Measurement	AC RMS, Peak, CF, Surge, dBm
Basic Accuracy (AC)	0.05% range + 0.05% reading + 0.1mV < 1kHz 0.15% range + 0.15% reading + 0.1mV < 10kHz 0.5% range + 0.5% reading + 0.025%/kHz + 0.4mV < 5MHz
Signal Generator	
Type	Direct Digital Synthesis, Single Frequency or Sweep
Frequency	5Hz to 45MHz
Waveforms	Sine, Square, Triangle, Ramp, White Noise
Accuracy	Frequency 5ppm over all temperature range Amplitude ±5% < 10MHz, Amplitude ±10% < 45MHz
Impedance	50 Ohm ± 2%
Scaling	1x10^-9 to 1x10^9
Output Level	50mVpk to 10Vpk
Input Ranges	
Inputs	2 x 10Vpk
Connectors	Ground referenced BNC
Coupling	AC
Max Input	10Vpk from earth
Input Ranges	Peak Ranging 1mV, 3mV, 10mV, 30mV, 100mV, 300mV, 1V, 3V, 10V
Scaling	1x10^-9 to 1x10^9
Ranging	Full auto, Up only or Manual
Input Impedance	50 Ohm or 1M Ohm High Impedance Selectable

ACCESSORIES AND PORTS

Instrument Accessories	
Probes	2x Probes
Leads	3x BNC to BNC (Output, CH1, CH2), RS232, Power
Software	CommView, SFRACoMM
Documentation	Calibration Certificate, User Manual
Newtons4th SFRA Transformer Connection System	
Bushing Clamps	2x Bushing Connection Clamps
BNC Cable Reel	N4L 18m Cable reel (Signal, CH1, CH2)
Earth Braid	2x 5 metre Earthing Braid
Earth Clamps	2x
Spare Earth Braid	2x 500mm
USB Stick	2 GB
Ports	
RS232	Baud Rate to 19200, RTS/CTS flow Control
USB	USB Port
LAN	10/100 base-T Ethernet auto sensing RJ45

SYSTEM SPECIFICATIONS

Sweep	
Functions	FRA, Impedance
Steps	Up to 2000 Steps
Window	From 50ms with no gap between each log
Memory	1 GB Internal or External USB
General	
Display	5.7" ¼VGA colour high brightness backlit
Dimensions (Instrument)	305Hx230Wx45D mm "Tablet Style"
Weight (Instrument)	2.7kg
Dimensions (Carry Case)	760mm x 420mm x 150mm
Weight (Full system including case)	14.9kg
Program Stores	100, Location 1 loaded on power up
Sweep Stores	2000, all parameters in any sweep function
Remote Operation	Full Capability, Control and Data
Temperature	-5 to 50°C ambient temperature, 20 to 90% non-condensing RH
Power Supply	9 – 18V @ 3A, AC adapter or 12V dc from car or external batteries
Warranty	3 Years

All specifications at 23°C ± 5°C . These specifications are quoted in good faith but Newtons4th Ltd reserves the right to amend any specification at any time without notice

Newtons4th

Contact your local N4L Distributor for further details

Newtons4th Ltd (abbreviated to N4L) was established in 1997 to design, manufacture and support innovative electronic equipment to a worldwide market, specialising in sophisticated test equipment particularly related to phase measurement. The company was founded on the principle of using the latest technology and sophisticated analysis techniques in order to provide our customers with accurate, easy to use instruments at a lower price than has been traditionally associated with these types of measurements

Flexibility in our products and an attitude to providing the solutions that our customers really want has allowed us to develop many innovative functions in our ever increasing product range

Newtons4th Ltd are ISO9001 registered, the internationally recognised standard for the quality management of businesses

In recognition of the technical innovation and commercial success of the PPA series, N4L received the "Innovation 2010" Queen's award for enterprise

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